way. Precast items are usually made at least 2½ in. thick.

Precast flagstones are most easily set on a sand bed. One part portland cement mixed with 3 to 5 parts sand will result in a firmer bed than will sand alone. After the stones are set, washing the patio with water provides moisture that will permit the sand-cement bed to harden into a firm base.

A wide range of precast items for the home, lawn, and garden is available at local precast plants. These items are often available in a variety of colors that are impossible for the individual homeowner to produce. The precaster also can provide artistic designs more economically since his forms will be reused several times. Suggestions on how to handle and set the precast items can usually be obtained from the seller.

Publications on a number of uses of concrete and recommendations for proper construction practices are available from the Portland Cement Association, Old Orchard Road, Skokie, Ill. 60076. A list of publications, with prices, will be sent free on request.

All About Brick And the 10,000 Ways It Comes

BRICK CAN BE USED in a wide variety of ways in and around the home. These uses include fireplaces, floors, decorative walls, dividers and planters inside the home, and barbecues, patios, screen walls, retainer walls and tree wells outside the home. Choosing the right brick and using proper construction techniques are key factors in the success of any brick project.

A brick is defined as a small building unit, solid or cored not in excess of 25 percent, commonly in the form of a rectangular prism formed from clay or shale and fused by heat. The cores in some units have been introduced as an aid to uniform drying and burning of the clay and as a means of reducing the weight.

Other brick-like materials on the market today include concrete brick, plastic brick, fly ash brick, glass brick, sawdust brick and even cow dung brick. All of these materials have different engineering properties than the real clay brick. These different properties may or may not suit the need for which they are intended.

The Federal Trade Commission requires the manufacturer of any product sold as a brick but produced from a material other than clay to specifically preface it as concrete brick, plastic brick or whatever. Only a clay brick can be referred to generically as "brick."

If other than clay brick is used, the purchaser should be thoroughly aware of the limitations of its use and not expect the same results that would be achieved by the use of clay units. Unless otherwise stated, I will be referring to clay brick when I use the term "brick" in this chapter.

Two principal types of manufacturing techniques are used in the production of brick.

- Molded brick is produced either by machine or hand molding techniques. A handmade appearance is achieved through the use of soft mud in the manufacturing process.
- Extruded brick is produced by forcing stiff mud through a die. These bricks are usually cored and have a more machine-perfect appearance. Various textures are applied to the sides of the unit.

Both molded and extruded brick can be used in most applications in and around the house. Molded brick is usually more expensive than extruded brick, but many feel the handmade look is worth the additional cost.

Brick is available in over 10,000 different sizes, shapes, textures and colors. The final choice of the brick unit having the right combination of these qualities

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is usually an esthetic consideration of the purchaser. Certain qualities, however, may be more desirable for some applications than for others.

Brick sizes are quoted as either a "nominal" or "actual" size. The nominal size is equal to the manufactured or actual size plus the thickness of the mortar joint for which the unit is designed.

For example, the standard modular brick has these actual dimensions: 3⅝" thick, 2¼" high, and 7⅝" long. Corresponding nominal dimensions for the same brick would be 4", 2 2/3" and 8". In this case a ⅜" mortar joint accounts for the difference.

All brick used in outdoor structures should be of an SW Grade. Used or salvaged brick should not be used unless they have been tested and meet SW Grade requirements. Type M or Type S mortar should be used.

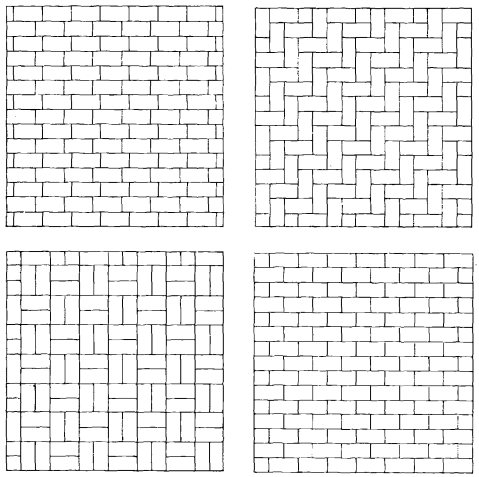
Composition of these mortars by volume is as follows:

Type M	*Type S*
1 part portland cement	1 part portland cement
¼ part hydrated lime	½ part hydrated lime
3 parts sand	4½ parts sand

All joints should be completely filled with mortar. This is particularly important since outdoor structures will be exposed to extreme weather.

Another common brick used around the home is the paving brick. This brick unit does not have any coring and is available in various sizes. Typical patio or walkway paving brick is 3⅝" thick by 7⅝" long and 2¼" in height. A 4" by 8" unit is generally used when mortarless paving is desired. The bricks are tightly abutted to each other over a firm base. The 3⅝" by 7⅝" by 2¼" unit is more easily utilized if mortar joints are desired.

If mortarless paving is desired, brick units that are twice as long as they are wide permit the selection of a wider range of design patterns. Mortared paving should be placed on a rigid base such as a concrete slab.



A few patterns available with the use of brick paving.

I would recommend a membrane layer of roofing felt or polyethylene plastic directly beneath mortarless paving. This reduces the tendency toward staining, and prevents grass and weed growth in the joint between the units.

Mortarless paving can be done with semi-skilled labor or by the handyman around the house. This may result in significant cost savings.

A brick fireplace or barbecue in conjunction with a patio will greatly enhance the livability of a back yard area.

For small yards a very simple barbecue grill can be constructed. To insure proper disposition of smoke, care should be taken in selection of the outdoor fireplace location. The fireplace should be planned to face the prevailing breezes so that the smoke will blow away and the best draft will be provided. Fire brick should be selected for the firebox of an outdoor fireplace.

While the simplest form of the barbecue grill might be built with brick by a handyman, I would suggest hiring an experienced mason for construction of a fireplace. Natural earth tones of brick make it ideal for these and other outdoor applications.

Other applications of brick outside the home include brick screen walls, planting boxes, edging, concealment

Some ways that brick can be used outside the home.

structures, fences and retaining walls. Pierced brick screens offer beauty as well as privacy without loss of light or air. They can provide a handsome separation between a children's play area and the adults' terrace.

Planters can be constructed of a wide variety of designs. Care should be taken to provide drainage in the form of weep holes through the brick or a drain at the bottom. The inside face of the walls should be waterproofed with an asphalt coating to prevent efflorescence or staining on the outside face.

Brick edging may be used to define a lawn area. Small brick enclosures may be used to conceal undesirable items. These structures may either be pierced walls to provide ventilation as

required in the case of an air conditioning unit, or solid walls which may be desirable in the case of trash cans. Brick fences can provide privacy and create a courtyard effect. This is particularly true for small lots such as townhouse lots.

One of the most frequent uses of brick in landscaping is in retaining walls. Applications of retaining walls are almost endless. A word of caution about retaining walls—they will function properly only if properly designed and constructed. They will be subject to the most severe conditions and, consequently, more care should be taken in their construction than for other brick structures. Professional advice should be sought.

Inside the home, brick has traditionally been used in fireplaces and in kitchens. Other interior applications in recent years include brick flooring, dividers and planters, and as exposed walls. Most interior applications require the skill of an experienced mason. Fireplaces, brick flooring and exposed walls are usually installed during construction of the home. Because brick is a heavy material, care should be taken to insure structural soundness when brick work is undertaken inside existing homes.

A fireplace has been called the "heart of the home." Literally hundreds of designs are possible, from colonial to contemporary. Choice of the design and style of brick will set the atmosphere of the room, whether it be a living room, family room, recreation room or even a bedroom. Fire brick should always be used around the firebox and special care should be taken to insure proper flue construction.

A brick fireplace wall is often expanded to include an entire wall in one room. An exposed interior brick wall such as this can be very decorative and provide a real contrast to paneling or other wall coverings.

Brick floors in entrance halls, family rooms and kitchens can be laid in a variety of patterns. Brick can be laid on concrete slabs or, with structural adjustments, over basements and crawl slabs. Interior brick flooring, if properly sealed, is easy to keep clean and will not show wear.

Brick dividers and planters are an inexpensive way to divide a large space or to create an attractive area for live plants.

Although brick used inside the home will be subject to virtually no deterioration, the texture of the face of the brick may be of concern in certain areas. Texture will vary from very smooth to very rough and include sand faced units and glazed brick.

A sand faced brick may not be desirable in areas where it will often be touched or rubbed. The sand will readily be rubbed off and may present a cleaning problem at floor level. Sand faced brick should never be used for flooring application.

A very rough textured brick will tend to snag clothes when the two come into contact. This type of texture, however, can produce an attractive wall if properly constructed.

Glazed brick can form a very striking wall. The typical glazed brick of the single-glaze type will cost about twice as much as an unglazed unit. Brilliant colors can be produced with a double glazed unit but this type of brick is seldom used, principally due to its cost—usually four to five times that of regular brick. Special ordering will probably be necessary.

Brick performs its functions of beauty and durability most noticeably when used on the exterior walls of the home. Brick is fire resistant and virtually maintenance free. It will not corrode, rot, split or warp. It can't be dented and it never has to be painted.

A unique characteristic of brick is its design flexibility. No other material can offer the designer the wide variety of colors, textures and patterns that can be incorporated into a house design as can brick. With proper design it can be used to bring out the stateliness of a traditional home as well as the natural look of a contemporary home.

Brick inside the home.

Brick walls will usually cost a little more than walls of other materials. The walls, however, are only a small portion (between 5 and 10 percent) of the price of a house. The cost differential between brick and other wall types is, therefore, modest. This initial cost difference will be recovered by the owner in the form of lower maintenance cost and through a higher resale value if the house is ever sold.

Bricks that have their exposed face sealed with some type of sealer are not recommended for exterior use. Glazed brick would fall in this category. Sealed brick does not allow the wall to "breathe" and may result in spalling or flaking away of the face of the brick. The painting of brick is not recommended for this same reason.

In summary, brick can be used to form a structure that is durable, esthetically pleasing, and virtually maintenance free. The variety of colors, textures and patterns available with brick give it a design flexibility unsurpassed by other materials. The success of a project, however, often requires the skill of an experienced mason.

Concrete Block— A Wide Choice for Different Jobs

VERSATILITY of concrete masonry is vividly demonstrated by the range of sizes and shapes of units being manufactured today. Forty years ago, inventory of a typical block manufacturing plant consisted of less than 30 different sizes. Today, this figure exceeds 100 and the total number of different sizes, shapes and types manufactured across the country is well over 700.

Units are made in sizes which range from one inch in thickness and in lengths up to 24 inches; they are solid or hollow and are made with dense and lightweight aggregates (materials).

The name designating various units has been fairly well standardized, and usually relates to the function in the wall. Illustrated with this chapter are several such units where the configuration implies the use for which the block is intended.

Size of a concrete masonry unit is usually described by listing its thickness, or width first, followed by its height and then its length. Thus, a 4 x 8 x 16 block has a nominal width of 4″, height of 8″ and length of 16″.

The nominal dimension includes ⅜″ allowed for the thickness of a standard mortar joint, so the actual dimensions of the well known 8″ x 8″ x 16″ unit are manufactured as 7⅝″ x 7⅝″ x 15⅝″.

American Society for Testing and Materials (ASTM) specifications permit a maximum variation in overall dimensions (length, width and height) of plus or minus ⅛″ from the actual dimensions specified by the manufacturer. It is the usual practice, however, to manufacture the units within a tolerance of plus or minus 1/16″.

Although the industry has standardized on exterior dimensions of modular units, differences in thickness of face shells and webs, and size and number of cores for the same size hollow unit may exist between manufacturers. As an example, the 8 x 8 x 16 hollow unit may range from about 50 percent to 63 percent solid, depending upon the size and number of cores. These variations may result from the need to obtain properties such as fire resistance, sound insulations, and the like.

Concrete masonry units offer a vast array of choices of natural faces and finishes for walls. These range from a wide variety that come at no extra cost to highly unusual, more expensive block for developing luxurious effects. Concrete masonry units may be classified with respect to wall finishes according to the headings described herein.

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